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BUREAU OF ENTOMOLOGY

FOREST INSECT INVESTIGATIONS

THE FLIGHTS OR DISSEMINATION OF FOREST INSECTS

1933

by

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Copy for Mr. Miller

THE FLIGHTS OR DISSEMINATION OF FOREST INSECTS

The results secured by certain artificial control projects against epidemics of the mountain pine beetle (Dendroctonus monticolae Hopk.) in the lodgepole pine stands of Montana and in the white pine stands of Idaho seem to indicate that flights of these bark beetles occur. Heavy reinfestations or sharp decreases have occurred where they were least expected, causing increases of several hundred percent on areas where all the infested timber had been treated; while adjoining areas where no control had been instituted showed a decrease. Such a condition could be caused by several factors, but in many instances the flight of insects from one area into another would seem to be the only logical explanation.

The epidemic of this insect that has destroyed millions of trees in Montana has been studied as it occurred in successive stages from the Flathead National Forest south through the Missoula, Bitterroot, Beaverhead, and Madison Forests. In many instances there were rather wide areas of open country between these forests and sometimes within the forests. Again, the only logical explanation of this occurrence seems to be the flight of the insects from one area to another.

Because of the important bearing the flights of forest insects have on all phases of control, a series of flight studies were started in 1931 by placing traps on several high mountain peaks in northern Idaho and eastern Washington. They were placed on high timberless peaks so that the insects would be caught while flying at these high elevations. The traps were of the automatic, weather-vane type and usually placed on poles about eighteen feet above the highest point of the peak. They were always faced into the wind by the action of a weather-vane tail; therefore, collections

were made only of insects being born with the wind. The insects collected were automatically preserved in a cyanide jar at the bottom of the trap.

The following peaks were selected for the experiment:

Roundtop	5800 ft.	Keniksu National Forest
Sullivan	6200 ft.	" " "
Little Guard	6000 ft.	Coeur d'Alene National Forest
Grizzly	6000 ft.	" " "
Grassy	5200 ft.	" " "
Emerald	4657 ft.	St. Joe National Forest

During 1931 and 1932, three important orders were collected:

Coleoptera, Diptera, and Hymenoptera. Twenty of the 65 species of Coleoptera collected were bark beetles. The mountain pine beetle was taken from the traps on both Roundtop and Sullivan mountains. Although these traps were not far from the timber, insects passing this point could, no doubt, have been blown for many miles before descending to the ground.

The following list presents the more important insects collected and the relative number to show abundance. The number of insects collected in the family Formicidae is not accurate however, as species of this family were sometimes so numerous as to almost fill the collecting jar.

LIST NO. 1

<u>Insect</u>	<u>Number Taken</u>	<u>Date</u>	<u>Locality</u>
<u>COLEOPTERA</u>			
<u>Carabidae</u>			Little Guard Mt.
<u>Sericoda bembidioides</u> Kby.	1	8/30/32	Coeur d'Alene, Ida.
<u>Sericoda quadropunctata</u> Dej.	1	8/1/32	Roundtop Mt. Metaline Falls, Wash.
<u>Harpalus</u> sp.	1	7/15/32	Sullivan Mt. Metaline Falls, Wash.
<u>Harpalus</u> sp.	1	7/8/31	Grassy Mt. Coeur d'Alene, Ida.

<u>Insect</u>	<u>Number Taken</u>	<u>Date</u>	<u>Locality</u>
COLEOPTERA			
Hydrophilidae			
<u>Sphaeridium scarabaeoides</u> L.	1	7/23/31	Roundtop Mt. Metaline Falls, Wash.
Silphidae			
<u>Hydnobius longulus</u> Lec.	1	7/9/32	Roundtop Mt. Metaline Falls, Wash.
Staphylinidae			
<u>Pelecomelium puberulum</u> Fvl.	2	7/13/32	Grassy Mt. Coeur d'Alene, Ida.
<u>Cyrophypus obsidianus</u> Mels	1	7/31/32	Little Guard Mt. Coeur d'Alene, Ida.
<u>Quedius marginalis</u> Mekl.	1	7/15/32	Sullivan Mt. Metaline Falls, Wash.
<u>Quedius marginalis</u> Mekl.	1	8/12/31	Roundtop Mt. Metaline Falls, Wash.
<u>Tachinus angustatus</u> Horn.	1	7/8/31	Grassy Mt. Coeur d'Alene, Ida.
<u>Bryoporus rufescens</u> Lec.	1	7/31/31	Grassy Mt. Coeur d'Alene, Ida.
<u>Aleocharinae</u> genus ?	1	7/9/32	Roundtop Mt. Metaline Falls, Wash.
<u>Atheta</u> sp.	1	7/8/31	Grassy Mt. Coeur d'Alene, Ida.
<u>Baryodma bimaculata</u> Grav.	1	8/12/31	Roundtop Mt. Metaline Falls, Wash.
Psilophidae			
<u>Oropus</u> sp. ?	1	7/8/31	Roundtop Mt. Metaline Falls, Wash.
Melyridae			
<u>Dasytes hudsonicus</u> Lec.	1	7/24/32	Grizzly Mt. Coeur d'Alene, Ida.
<u>Dasytes hudsonicus</u> Lec.	9	7/21/32	Little Guard Mt. Coeur d'Alene, Ida.
Cleridae			
<u>Enoclerus tecontei</u> Mole.	1	7/30/31	Roundtop Mt. Metaline Falls, Wash.

<u>Insect</u>	<u>Number taken</u>	<u>Date</u>	<u>Locality</u>
COLLEMBOLA			
Mordellidae			
<u>Anaspis atrata</u> Champ.	1	7/30/31	Grassy Mt. Coeur d'Alene, Ida.
<u>Anaspis atrata</u> Champ.	1	7/8/31	Grassy Mt. Coeur d'Alene, Ida.
Histeridae			
<u>Limonius niger</u> Lec.	1	7/13/32	Grassy Mt. Coeur d'Alene, Ida.
<u>Betarmon bigeminatus</u> Randall	1	7/8/31	Grassy Mt. Coeur d'Alene, Ida.
Buprestidae			
<u>Buprestis longi</u> Mann.	1	8/17/32	Grizzly Mt. Coeur d'Alene, Ida.
<u>Melanophila fulvoguttata</u> Var.	1	8/3/32	Emerald Mt. Princeton, Ida.
<u>Melanophila drummondi</u> Kby.	1	8/17/32	Emerald Mt. Princeton, Ida.
Ostomidae			
<u>Temnochila vivescens</u> Fab.	1	8/23/32	Grassy Mt. Coeur d'Alene, Ida.
Nitidulidae			
<u>Nitidula birungtata</u> L.	1	8/20/32	Little Guard Mt. Coeur d'Alene, Ida.
Cryptophagidae			
<u>Cryptophagus</u> sp.	1	7/31/31	Grassy Mt. Coeur d'Alene, Ida.
<u>Cryptophagus</u> sp.	1	8/23/32	Grizzly Mt. Coeur d'Alene, Ida.
Colydiidae			
<u>Lasconotus schwarzi</u> Kraus.	1	8/10/32	Roundtop Mt. Metaline Falls, Wash.
Lathridiidae			
<u>Corticaria occidentalis</u> Fall.	1	8/30/32	Little Guard Mt. Coeur d'Alene, Ida.
Coccinellidae			
<u>Psyllobura separata</u> Gay.	1	7/13/32	Grassy Mt. Coeur d'Alene, Ida.

<u>Insect</u>	<u>Number Taken</u>	<u>Date</u>	<u>Locality</u>
<u>COLEOPTERA</u>			
<u>Coccinellidae</u>			
<u>Hypodamia caseyi</u> John.	3	8/2/31	Roundtop Mt. Metaline Falls, Wash.
<u>Cleis minor</u> Gay.	7	8/20/32	Little Guard Mt. Coeur d'Alene, Ida.
<u>Anatis quindecimpunctata</u> Ol.	3	8/10/32	Little Guard Mt. Coeur d'Alene, Ida.
<u>Neomysia oregona</u> Gay.	1	7/31/32	Little Guard Mt. Coeur d'Alene, Ida.
<u>Tenebrionidae</u>			
<u>Hypophloeus</u> sp.	1	7/19/31	Roundtop Mt. Metaline Falls, Wash.
<u>Hypophloeus</u> sp.	1	8/30/31	Roundtop Mt. Metaline Falls, Wash.
<u>Hypophloeus</u> sp.	1	7/20/32	Roundtop Mt. Metaline Falls, Wash.
<u>Anobiidae</u>			
<u>Trinobius gentilis</u> Fall.	1	7/18/32	Roundtop Mt. Metaline Falls, Wash.
<u>Cerambycidae</u>			
<u>Stenocorus inquisitor</u> Linn.	1	7/8/31	Roundtop Mt. Metaline Falls, Wash.
<u>Anoplerda canadensis</u> Fab.	1	8/17/32	Grizzly Mt. Coeur d'Alene, Ida.
<u>Monocheamus oregonensis</u>	1	8/23/32	Grassy Mt. Coeur d'Alene, Ida.
<u>Chrysomelidae</u>			
<u>Pachybrachis</u> sp.	2	7/31/32	Little Guard Mt. Coeur d'Alene, Ida.
<u>Diachus erebus</u> Lec.	1	8/3/32	Grassy Mt. Coeur d'Alene, Ida.
<u>Luperodes varipes</u> Lec.	1	7/8/31	Roundtop Mt. Metaline Falls, Ida.
<u>Luperodes varipes</u> Lec.	6	8/20/32	Little Guard Mt. Coeur d'Alene, Ida.
<u>Luperodes varipes</u> Lec.	1	7/8/31	Grassy Mt. Coeur d'Alene, Ida.

<u>Insect</u>	<u>Number Taken</u>	<u>Date</u>	<u>Locality</u>
<u>COLLEOPTERA</u>			
<u>Curculionidae</u>			
<u>Rhinomacer comptus</u> Lec.	1	8/1/32	Roundtop Mt. Metaline Falls, Wash.
<u>Sitona</u> sp.	2	7/11/31	Roundtop Mt. Metaline Falls, Wash.
<u>Euclyptus rutilus</u> Fall.	1	8/29/32	Grizzly Mt. Coeur d'Alene, Ida.
<u>Tychius tectus</u> Lec.	1	7/20/32	Roundtop Mt. Metaline Falls, Wash.
<u>Mordalis</u> sp. ?	1	8/7/32	Grizzly Mt. Coeur d'Alene, Ida.
<u>Scolytidae</u>			
<u>Scolytus unisquinosus</u> Lec.	1	7/23/31	Roundtop Mt. Metaline Falls, Wash.
<u>Scolytus praecens</u> Lec.	1	7/18/32	Emerald Mt. Princeton, Ida.
<u>Scolytus praecens</u> Lec.	1	8/23/32	Grassy Mt. Coeur d'Alene, Ida.
<u>Scolytus ventralis</u> Lec.	3	8/23/32	Grassy Mt. Coeur d'Alene, Ida.
<u>Scolytus ventralis</u> Lec.	3	7/17/31	Roundtop Mt. Metaline Falls, Wash.
<u>Scolytus ventralis</u> Lec.	3	8/23/32	Grassy Mt. Coeur d'Alene, Ida.
<u>Scolytus abietis</u> n. sp.	1	7/18/32	Emerald Mt. Princeton, Ida.
<u>Scolytus laricis</u> n. sp.	2	7/8/31	Grassy Mt. Coeur d'Alene, Ida.
<u>Polygraphus rufipennis</u> Kby.	1	8/16/31	Roundtop Mt. Metaline Falls, Wash.
<u>Polygraphus rufipennis</u> Kby.	1	8/20/31	Roundtop Mt. Metaline Falls, Wash.
<u>Polygraphus rufipennis</u> Kby.	2	7/8/31	Roundtop Mt. Metaline Falls, Wash.
<u>Polygraphus rufipennis</u> Kby.	1	8/15/31	Grassy Mt. Coeur d'Alene, Ida.

<u>Insect</u>	<u>Number Taken</u>	<u>Date</u>	<u>Locality</u>
<u>COLEOPTERA</u>			
<u>Scolytidae</u>			
<u>Carpoborus</u> sp.	2	7/15/32	Roundtop Mt. Metaline Falls, Wash.
<u>Dendroctonus monticolae</u> Hopk.	1	7/29/31	Roundtop Mt. Metaline Falls, Wash.
<u>Dendroctonus monticolae</u> Hopk.	1	7/15/32	Sullivan Mt. Metaline Falls, Wash.
<u>Dendroctonus valens</u> Lec.	1	7/24/32	Grizzly Mt. Coeur d'Alene, Ida.
<u>Pseudohy lesinus nebulosus</u> Lec.	1	8/20/31	Roundtop Mt. Metaline Falls, Wash.
<u>Pityophthorus tuberculatus</u> Rich.	3	7/30/32	Sullivan Mt. Metaline Falls, Wash.
<u>Pityophthorus tuberculatus</u> Rich.	2	7/8/31	Roundtop Mt. Metaline Falls, Wash.
<u>Pityophthorus pseudotsugae</u> Sw.	2	7/15/32	Roundtop Mt. Metaline Falls, Wash.
<u>Pityophthorus murrayanae</u> Blkm.	3	7/23/32	Sullivan Mt. Metaline Falls, Wash.
<u>Pityophthorus</u> sp.	1	8/19/31	Roundtop Mt. Metaline Falls, Wash.
<u>Pityogenes fossifrons</u> Lec.	7	7/15/31	Roundtop Mt. Metaline Falls, Wash.
<u>Pityogenes fossifrons</u> Lec.	1	8/20/31	Roundtop Mt. Metaline Falls, Wash.
<u>Pityogenes fossifrons</u> Lec.	7	7/8/31	Roundtop Mt. Metaline Falls, Wash.
<u>Pityogenes fossifrons</u> Lec. ?	14	7/15/32	Roundtop Mt. Metaline Falls, Wash.
<u>Pityogenes fossifrons</u> Lec.	1	7/23/32	Roundtop Mt. Metaline Falls, Wash.
<u>Pityogenes fossifrons</u> Lec.	1	8/19/31	Roundtop Mt. Metaline Falls, Wash.

<u>Insect</u>	<u>Number Taken</u>	<u>Date</u>	<u>Locality</u>
COLEOPTERA			
Scolytidae			
<u>Pityogenes knechteli</u> SW.	1	7/29/33	Kite Trap Dillon, Montana
<u>Ips vancouveri</u> SW.	2	7/29/31	Roundtop Mt. Metaline Falls, Wash.
<u>Ips oregoni</u> Mich.	1	8/20/31	Roundtop Mt. Metaline Falls, Wash.
<u>Ips oregoni</u> Mich.	1	7/28/33	Kite Trap Dillon, Montana
<u>Pityokteines elegans</u> SW.	1	7/24/32	Grizzly Mt. Coeur d'Alene, Ida.
<u>Pityokteines minutus</u> SW.	2	7/8/31	Roundtop Mt. Metaline Falls, Wash.
<u>Pityokteines minutus</u> SW.	3	7/11/31	Roundtop Mt. Metaline Falls, Wash.
<u>Pityokteines minutus</u> SW.	1	8/19/31	Roundtop Mt. Metaline Falls, Wash.
<u>Pityokteines minutus</u> SW.	8	7/15/32	Roundtop Mt. Metaline Falls, Wash.
DIPTERA			
Simuliidae			
<u>Prosimulium</u> sp.	1	7/7/32	Grizzly Mt. Coeur d'Alene, Ida.
Asilidae			
<u>Asilus mesae</u> Tuckor	1	7/8/31	Grassy Mt. Coeur d'Alene, Ida.
Empididae			
<u>Oedales</u> sp.	1	8/12/31	Roundtop Mt. Metaline Falls, Wash.
<u>Hilara</u> sp.	1	7/17/32	Grizzly Mt. Coeur d'Alene, Ida.
<u>Rhamphomyia</u> sp.	1	7/13/32	Sullivan Mt. Metaline Falls, Wash.
Phoridae			
<u>Megaselia</u> sp.	1	7/8/31	Grassy Mt. Coeur d'Alene, Ida.

<u>Insect</u>	<u>Number Taken</u>	<u>Date</u>	<u>Locality</u>
DIPTERA			
Pipunculidae			
<u>Pipunculus</u> sp.	1	8/23/32	Grassy Mt. Coeur d'Alene, Ida.
Tachinidae			
<u>Tachinid</u> genera	1	8/10/32	Little Guard Mt. Coeur d'Alene, Ida.
Anthomyiidae			
<u>Anthomyid</u>	1	8/20/32	Sullivan Mt. Metaline Falls, Wash.
<u>Hylemyia</u>	6	7/13/32	Grassy Mt. Coeur d'Alene, Ida.
<u>Hylemyia</u>	1	8/20/32	Little Guard Mt. Coeur d'Alene, Ida.
<u>Schoenomyza dorsalis</u> Lw.	1	7/13/32	Grassy Mt. Coeur d'Alene, Ida.
Helomyzidae			
sp.	1	8/7/32	Grizzly Mt. Coeur d'Alene, Ida.
Borboridae			
sp.	1	7/8/31	Roundtop Mt. Metaline Falls, Wash.
<u>Borborus equinus</u> Fall.	1	7/13/32	Grassy Mt. Coeur d'Alene, Ida.
Sapronyziidae			
sp.	1	7/17/32	Grizzly Mt. Coeur d'Alene, Ida.
Sepsidae			
<u>Pliphila nigriceps</u> Mg.	1	7/17/32	Grizzly Mt. Coeur d'Alene, Ida.
Geomyzidae			
sp.	1	7/8/31	Grassy Mt. Coeur d'Alene, Ida.
Ochthiphilidae			
<u>Leuconis</u> sp.	3	7/24/32	Grizzly Mt. Coeur d'Alene, Ida.

<u>Insect</u>	<u>Number Taken</u>	<u>Date</u>	<u>Locality</u>
<u>HYMENOPTERA</u>			
<u>Braconidae</u>			
<u>Microplitis plulettae</u> Kus.	1	7/17/32	Grizzly Mt. Coeur d'Alene, Ida.
<u>Aphidius procephali</u> Ashm.	1	7/12/32	Roundtop Mt. Metaline Falls, Wash.
<u>Aphidius juniperaphidis</u> Gahan	1	7/21/32	Little Guard Mt. Coeur d'Alene, Ida.
<u>Ephedrus nigricornis</u> Gahan	1	8/29/32	Grizzly Mt. Coeur d'Alene, Ida.
<u>Rogas</u> sp.	1	8/7/32	Grizzly Mt. Coeur d'Alene, Ida.
<u>Chelonus</u> sp.	1	8/7/32	Grizzly Mt. Coeur d'Alene, Ida.
<u>Apanteles</u> sp.	1	7/31/31	Grassy Mt. Coeur d'Alene, Ida.
<u>Triaspis</u> sp.	1	7/21/32	Little Guard Mt. Coeur d'Alene, Ida.
<u>Ichneumonidae</u>			
<u>Stylocryptus</u> n. sp.	1	8/2/31	Roundtop Mt. Metaline Falls, Wash.
<u>Stylocryptus vulgaris</u> Cress.	1	8/23/32	Grassy Mt. Coeur d'Alene, Ida.
<u>Hemiteles</u> sp.	1	8/20/32	Little Guard Mt. Coeur d'Alene, Ida.
<u>Ephialtes sanguineipes</u> Cress.	1	8/20/32	Little Guard Mt. Coeur d'Alene, Ida.
<u>Gelis</u> sp.	1	7/8/31	Grassy Mt. Coeur d'Alene, Ida.
<u>Phaeogenes</u> n. sp.	1	7/8/31	Grassy Mt. Coeur d'Alene, Ida.
<u>Pteromalidae</u>			
<u>Pachyneuron allograptae</u>	1	8/23/32	Grassy Mt. Coeur d'Alene, Ida.
<u>Pseudocentistes americanus</u> Gah.	1	8/23/32	Grassy Mt. Coeur d'Alene, Ida.

<u>Insect</u>	<u>Number Taken</u>	<u>Date</u>	<u>Locality</u>
HYMENOPTERA			
Pteromalidae			
<u>Habrocytus</u> sp.	1	8/29/32	Grizzly Mt. Coeur d'Alene, Ida.
Eurytomidae			
<u>Eurytoma</u> sp.	9	8/23/32	Grassy Mt. Coeur d'Alene, Ida.
Eucharidae			
<u>Pseudochalcus</u> ? <u>gibbons</u> Say.	1	8/7/32	Grizzly Mt. Coeur d'Alene, Ida.
Scelionidae			
<u>Telenomus</u> sp.	1	7/24/32	Grizzly Mt. Coeur d'Alene, Ida.
Formicidae			
<u>Formica</u> <u>fusca</u> L. var.	4	7/30/31	Roundtop Mt. Metaline Falls, Wash.
<u>Prenolepis</u> <u>imparis</u> Say.	5	8/7/32	Grizzly Mt. Coeur d'Alene, Ida.
<u>Formica</u> sp.	2	8/10/32	Little Guard Mt. Coeur d'Alene, Ida.
<u>Myrmica</u> sp.	25	7/31/31	Grassy Mt. Coeur d'Alene, Ida.
<u>Myrmica</u> sp.	15	7/8/31	Grassy Mt. Coeur d'Alene, Ida.
<u>Myrmica</u> sp.	306	7/30/31	Roundtop Mt. Metaline Falls, Wash.
<u>Myrmica</u> sp.	212	8/19/31	Roundtop Mt. Metaline Falls, Wash.
<u>Myrmica</u> sp.	8	8/25/32	Sullivan Mt. Metaline Falls, Wash.
Chrysididae			
<u>Elleobius</u> sp.	1	7/24/32	Grassy Mt. Coeur d'Alene, Ida.
Sphecidae			
<u>Passaloecus</u> sp.	1	8/7/32	Grizzly Mt. Coeur d'Alene, Ida.

A mistake in the use of weather-vane traps was that they were not

located far enough from infested timber, for while the insects caught were taken in flight over some of our highest peaks, it did not prove that they went higher nor did it prove that they flew for long distances. In the future, weather-vane traps will be placed on open ridges or plains with less regard to altitude, and more thought to distance from timber.

Further work was undertaken by the use of Click aeroplane traps which were fastened to the wings of an observation plane. Collections were made on a series of gummed screens which were exposed at various altitudes. However, insects collected in this manner were usually so badly damaged as to prevent determination.

Collections from the aeroplane traps made over Yellowstone Park and over the Coeur d'Alene Forest are given in the following list. The altitudes given are altimeter readings taken at the time of exposure and vary from 500 feet to several thousand feet above the ground. The rough topography over which the collections were made prohibited any accurate data as to the height at which the insects were taken. Exposures were made as high as 13,000 feet, but without results. Nearly all the insects were taken at lower elevations.

LIST NO. 2

CLICK AEROPLANE TRAPS

<u>Insect</u>	<u>Locality</u>	<u>Altitude</u>	<u>Date</u>
DIPTERA			
Sciuridae			
sp.	Yellowstone Park, Wyo.	6600	7/9/31
sp.	Yellowstone Park, Wyo.	6000	7/9/31
Chironomidae			
sp.	Yellowstone Park, Wyo.	6000	7/9/31
Empididae			
sp.	Yellowstone Park, Wyo.	9100	7/9/31
Dolichopodidae			
sp.	Yellowstone Park, Wyo.	9600	7/9/31

<u>Insect</u>	<u>Locality</u>	<u>Altitude</u>	<u>Date</u>
DIPTERA			
Dolichopodidae			
sp.	Yellowstone Park, Wyo.	8200	7/9/31
Phoridae			
<u>Megaselia</u> sp.	Yellowstone Park, Wyo.	9200	7/9/31
Syrphidae			
<u>Syrphus</u> sp.	Yellowstone Park, Wyo.	8200	7/9/31
<u>Syrphus</u> sp.	Coeur d'Alene Forest, Ida.	3000-6000	7/31/32
	(2 specimen)		
Anthomyiidae			
<u>Hylemyia ciliata</u> Foll.	Yellowstone Park, Wyo.	9200	7/9/31
<u>Hylemyia</u> sp.	Coeur d'Alene Forest, Ida.	3000-5000	7/21/32
	(3 specimen)		
HYMENOPTERA			
Ichneumonidae			
<u>Plectiscus</u> sp.	Yellowstone Park, Wyo.	9600	7/9/31
Pteromalidae			
<u>Pteromalidae</u> sp.	Yellowstone Park, Wyo.	9000	7/9/31
<u>Pachyneuron</u> sp.	Yellowstone Park, Wyo.	6600	7/9/31
<u>Pachyneuron</u> sp.	Yellowstone Park, Wyo.	9600	7/9/31
<u>Pachyneuron</u> sp.	Yellowstone Park, Wyo.	8200	7/9/31
Encyrtidae			
<u>Bareocryptus bakeri</u> var.		6000-	
<u>gemma</u> Gir.	Yellowstone Park, Wyo.	6600-8800	7/9/31
<u>Microterys</u> sp.	Yellowstone Park, Wyo.	7500	7/9/31
Eurytomidae			
<u>Eurytoma</u> sp.	Coeur d'Alene Forest, Ida.	3000-5000	7/31/32

During the past summer, large nets shaped much like an airport windsock with the end terminating in a small screen bottle were raised by means of large Weather Bureau kites. It was found that in a fair wind one of these kites would raise a net with twelve square feet of catching surface to altitudes as high as 8,000 feet above the ground. Steel piano wire was used for a kite string and a hand reel weighing about seventy pounds was

used to raise and lower the kites. The field work was conducted seven miles southwest of Dillon, Montana, in the open plains between the Beaverhead and the Madison Forests. The location chosen was some twenty-five miles from timber in the direction from which the prevailing wind came; fourteen miles from timber to the northwest; and ten miles from timber to the southeast. The wind varied from the southwest to west during the flights. Eight successful flights were made giving a total of 29 hours and 30 minutes in the air at elevations up to 8,000 feet above the ground.

Collections made with these traps consisted mainly of small flies as yet undetermined. However, two scolytids were collected; one (Ips oregoni Eich.) was taken from the trap after a flight of 7½ hours during which the kite varied from 1500 to 5000 feet above the ground; one (Pityogenes knechteli Sw.) was taken after a flight of 8½ hours. Little value can be given to the capture of insects other than the scolytids because they may have been taken near the ground while the kite was being raised or lowered, but the collection of the two scolytids in flight so far from timber is significant that long flights of these species actually occur.

Further work is planned for the coming summer and an attempt will be made to open and close the trap while in flight. This and the variation of the kite while in flight were the only objectional features encountered.

Respectfully submitted,

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Assistant Scientific Aid



The weather-vane trap in action on Grassy mountain.



Click aeroplane traps mounted between the wings of an observation plane.

The picture shows the collecting screens exposed.



Kites and reel used for high altitude collections.
One of the collecting nets is shown in the foreground.